What is claimed is:

1. A scanning optical system for dynamically deflecting a laser beam emitted from a light source by a deflecting system, converging the dynamically deflected laser beam by an imaging optical system into a spot beam on a scan target surface, and thereby scanning the spot beam in a main scanning direction on the scan target surface, comprising:

a collimator lens being placed on an optical path between said light source and said deflecting system,

wherein at least one of a front surface and a rear surface of said collimator lens including:

a central area through which part of the laser beam in the vicinity of a central axis of the laser beam passes;

at least one first outer area through which part of the laser beam outside the laser beam incident on said central area passes, said at least one first outer area having an effect on the laser beam so that the laser beam after passing through said at least one first outer area is given a first phase difference with respect to the laser beam passing through said central area, the first phase difference not including a phase difference of zero; and

at least one second outer area through which part of the laser beam other than the laser beam incident on said central area and said at least one first outer area passes,

said at least one second outer area having an effect on the laser beam so that the laser beam after passing through said at least one second outer area is given a second phase difference with respect to the laser beam passing through said central area, the second phase difference being different from the first phase difference and including a phase difference of zero.

2. The scanning optical system according to claim 1, wherein the first phase difference satisfies the following conditions:

$$\cos\theta \leq 0 \quad \cdots (1)$$

$$0 < \theta < 10\pi \quad \cdots (2)$$

where θ [rad] represents said first phase difference, and θ is positive ($0<\theta$) when the thickness of said collimator lens changes in a decreasing direction from said central area through said at least one first outer area by a step formed between said central area and said at least one first outer area.

3. The scanning optical system according to claim 2, wherein the second phase difference satisfies the following conditions:

$$0.9 \leq \cos\theta' \quad \cdots (3)$$

$$0 < \theta' < 10\pi \quad \cdots (4)$$

$\theta < \theta'$ ··· (5)

where θ' [rad] represents said second phase difference, and θ' is positive ($0<\theta'$) when the thickness of said collimator lens changes in a decreasing direction from said central area through said at least one second outer area by a sum of a step formed between said central area and said at least one first outer area and a step formed between said at least one first outer area and said at least one second outer area.

4. The scanning optical system according to claim 1,

wherein the first phase difference satisfies the following conditions:

$\cos\theta \leq 0$ ··· (6)

$-10\pi < \theta < 0$ ··· (7)

where θ [rad] represents said first phase difference, and θ is negative ($0>\theta$) when the thickness of said collimator lens changes in an increasing direction from said central area through said at least one first outer area by a step formed between said central area and said at least one first outer area.

5. The scanning optical system according to claim 4,

wherein the second phase difference satisfies the following conditions:

$$0.9 \leq \cos\theta' \quad \cdots (8)$$

$$-10\pi < \theta' < 0 \quad \cdots (9)$$

$$\theta' < \theta \quad \cdots (10)$$

where θ' [rad] represents said second phase difference, and θ' is negative ($0>\theta'$) when the thickness of said collimator lens changes in an increasing direction from said central area through said at least one second outer area by a sum of a step formed between said central area and said at least one first outer area and a step formed between said at least one first outer area and said at least one second outer area.

6. The scanning optical system according to claim 1, wherein said at least one first outer area includes a plurality of first outer areas, and said at least one second outer area includes a plurality of second outer areas.

7. The scanning optical system according to claim 6, wherein the plurality of first outer areas and the plurality of second outer areas are provided in said scanning optical system as a plurality of pairs of the first and second outer areas.

8. The scanning optical system according to claim 7,

wherein said plurality of pairs of said first and second outer areas include two pairs of said first and second outer areas.

9. The scanning optical system according to claim 7, wherein one of said first outer areas nearest to the central axis of the laser beam adjoins said central area from the outside of said central area with respect to the central axis of the laser beam.

10. The scanning optical system according to claim 9, wherein one of said second outer areas nearest to the central axis of the laser beam adjoins the one of said first outer areas nearest to the central axis of the laser beam from the outside of the one of said first outer areas nearest to the central axis of the laser beam with respect to the central axis of the laser beam.

11. The scanning optical system according to claim 6, wherein the plurality of first outer areas and the plurality of second outer areas are arranged alternately outward from said central area.

12. The scanning optical system according to claim 11, wherein the plurality of the first and second outer

areas are formed to be concentrically arranged step-like rings, respectively, with respect to the central axis of the laser beam.

13. The scanning optical system according to claim 12, wherein thickness of said collimator lens changes in an increasing direction at each step formed between adjacent step-like rings.

14. The scanning optical system according to claim 12, wherein thickness of said collimator lens changes in a decreasing direction at each step formed between adjacent step-like rings.

15. The scanning optical system according to claim 1, wherein said scanning optical system satisfies a condition:

$$0.03 < S'/S < 0.3 \quad \cdots\cdots (11)$$

where S' represents a size of a portion of said at least one first outer area, the laser beam being incident on said at least one first outer area within the portion of said at least one first outer area, and S represents a size of a laser beam cross section orthogonal to the central axis of the laser beam on a surface of said collimator lens having said central area and at least one first and second outer areas.

16. The scanning optical system according to claim 1, wherein said collimator lens further includes a shading part as an aperture stop, and

wherein said central area and said at least one first and second outer areas are placed in an aperture of said shading part.

17. The scanning optical system according to claim 1, wherein said at least one first outer area and said at least one second outer area are arranged on both sides of said central area along the main scanning direction in order in which said at least one first outer area is arranged inside said at least one second outer area with reference to said central area.

18. The scanning optical system according to claim 1, wherein said imaging optical system includes a reflecting surface.

19. A printer having a scanning optical system for dynamically deflecting a laser beam emitted from a light source by a deflecting system, converging the dynamically deflected laser beam by an imaging optical system into a spot beam on a scan target surface, and thereby scanning

the spot beam in a main scanning direction on the scan target surface,

said scanning optical system including:

a collimator lens being placed on an optical path between said light source and said deflecting system,

wherein at least one of a front surface and a rear surface of said collimator lens including:

a central area through which part of the laser beam in the vicinity of a central axis of the laser beam passes;

at least one first outer area through which part of the laser beam outside the laser beam incident on said central area passes, said at least one first outer area having an effect on the laser beam so that the laser beam after passing through said at least one first outer area is given a first phase difference with respect to the laser beam passing through said central area, the first phase difference not including a phase difference of zero; and

at least one second outer area through which part of the laser beam other than the laser beam incident on said central area and said at least one first outer area passes, said at least one second outer area having an effect on the laser beam so that the laser beam after passing through said at least one second outer area is given a second phase difference with respect to the laser beam passing through said central area, the second phase difference being

different from the first phase difference and including a phase difference of zero.